

The preference for remoteness – the distribution and status of the Galapagos shark (*Carcharhinus galapagensis*) in Macaronesia, a rare insular European elasmobranch species

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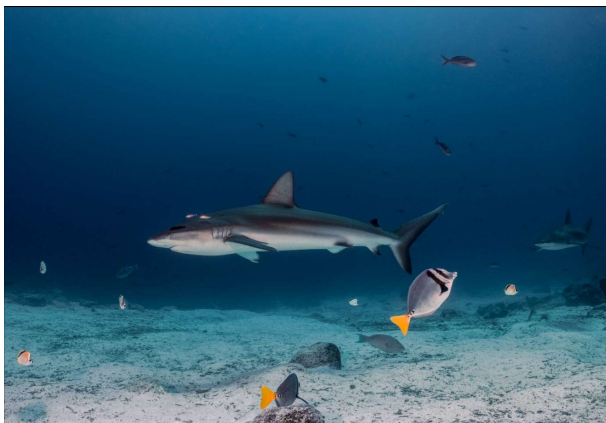


Figure 1: Adult female of *Carcharhinus galapagensis* around the Galápagos Archipelago, the type locality of this species. This large-bodied (~3.70 m TL) whaler shark exhibit a very unusual distribution pattern with occurrences around oceanic islands. © Louis David

Introduction

The Galapagos shark (*Carcharhinus galapagensis* SNODGRASS & HELLER, 1905; Fig. 1) exhibit a worldwide distribution around tropical, subtropical, and warm-temperate oceanic islands, archipelagos, atolls, and seamounts across all three major ocean basins (EBERT et al., 2021). This shark is hard-to-determine, and it can be easily confused with several congeneric species, most likely with the dusky shark (*Carcharhinus obscurus* LESUER, 1818), from which it can only be distinguished with certainty by the numbers of vertebrae or genetic investigation methods (GARRICK, 1982; PAZMIÑO et al., 2017). This shark is apparently confined to insular habitats in large distance to continental shores. The distribution of *C. galapagensis* can be described as „patchy“, „scattered“, or „disjunct“. However, this remarkable and pronounced distribution pattern is poorly understood, which makes the Galapagos shark to one of the remaining mysteries in the shark world. The understanding of the spatial connectivity of separated populations is crucial for the delineation of single stocks and management units. Due to a scarcity of records, the Northeast Atlantic can be assessed a data-poor region regarding the information about *C. galapagensis*.

Methods

The author conducted an extensive review of the available literature that included distributional data of *C. galapagensis* under consideration of non-English references. Moreover, this investigation included also voucher specimens that are housed in ichthyological collections. The data derived from these sources were used to create a reliable and updated distribution map that displays the current state of knowledge of Galapagos shark occurrences both for Europe and the entire world.

Results

The review of published literature revealed for this large requiem shark only 69 verified records worldwide, consisting of 53 occurrences around oceanic islands and only 16 at continental coasts (GAUSMANN, 2024). For the latter, only adults and subadults have been reported, which are assessed as roamers, and small juvenile specimens occur exclusively around oceanic islands, leading to the conclusion that insular habitats are very likely nurseries for this shark. For Europe, there are only 4 records of *C. galapagensis* from oceanic island habitats (Fig. 2). Thus, *C. galapagensis* can be considered rare in Europe because this species is restricted to oceanic islands of Macaronesia. Its distribution is restricted to the Portuguese and Spanish islands of the Northeast Atlantic Ocean (Azores Archipelago, Madeira, Savage Islands, Lanzarote; Fig. 2 & Tab. 1).

Figure 2: The known distribution of *Carcharhinus galapagensis* in Macaronesia (Northeast Atlantic) includes some remote oceanic islands of Portugal and Spain such as the Azores, Madeira, the Savage Islands, and Lanzarote (Canary Islands) (GAUSMANN, 2024)

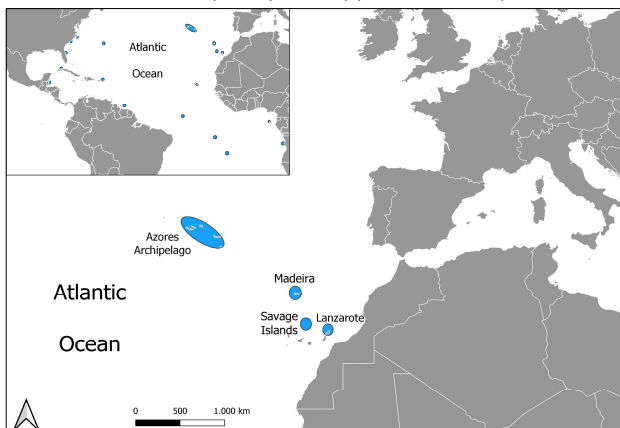


Table 1: Country occurrences of *Carcharhinus galapagensis* for insular Europe derived by literature as well as museum specimens. Abbreviations: V = Vagrant: rare, individuals present probably recruited from other distant sites; ? = population status unknown; Life history stage (LHS): juv = juvenile; Length specification: TL = Total Length; MCN = Museum Catalog Number (excerpt from: GAUSMANN, 2024)

No.	Toponym	Country	Year of first record	Main References	Status	LHS, Size & MCN	Comments
1	Azores Archipelago [37.15°N, -24.45°E]	Portugal	1988	BRUM & AZEVEDO (1995)	V	juv 865, 890, 975, 990 mm TL	~3.600 km off North America and ~1.800 km off Africa
2	Madeira [32.77°N, -16.98°E]	Portugal	1982	GARRICK (1982)	?	juv BMNH 62.6.14 (890 mm TL) MHNH (MMF) 023409	Located in 670 km distance to Africa (coast of Morocco)
3	Savage Islands [30.14°N, -15.86°E]	Portugal	1982	GARRICK (1982)	?	juv BMNH 95.5.28.143 (827 mm TL)	~480 km off the African continent
4	Lanzarote [29.26°N, -13.50°E]	Spain	1991	BRITO (1991) FALCÓN et al. (2002)	?	?	Reported from La Graciosa, ~200 km off the African continent

Discussion

Despite its current assessment with „Least Concern“ by the IUCN on a global scale (KYNE et al., 2019) and a few populations of this shark protected by Marine Protected Areas (MPAs), many of the populations are unprotected, making them vulnerable to strong fishing pressure and depletion. In the past, there is evidence for a near-extirpation of the Galapagos shark at Saint Peter and Saint Paul Archipelago (Brazil) resulting from overexploitation (LUIZ & EDWARDS, 2011). For the 4 European islands, information is largely outdated, which is unpleasant regarding a proper assessment of stocks. Thus, there is urgent need to clarify the status of *C. galapagensis* around the Portuguese and Spanish islands from where this shark has been reported historically (Tab. 1) by intensifying research efforts targeting this species. Although it can be assumed that these widely separated islands of Macaronesia are connected through gene flow by a few migratory specimens, nothing is known about the migration behavior of *C. galapagensis* in the Northeast Atlantic Ocean and potential migratory corridors.

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